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ABSTRACT

The nature of classroom activities, cognitive learning opportunities, and instruction in seventh and eighth grades within the academic subject areas was examined. The purpose was to describe and interpret classroom learning opportunities in terms compatible with the complexity of typical classroom events and teachers' understanding of those events. Twelve English, science, and social studies teachers and 550 students from 3 northeastern seventh and eighth grade suburban schools participated in the study. Each classroom was observed 4 times by a project team member for a total of 92 observations. During each observation, the following information was recorded: (1) the nature and duration of academic activities; (2) the type of academic tasks students were expected to accomplish during each activity; and (3) the nature of any cognitive instruction provided. On the basis of observers' descriptive data, multivariate analysis revealed significant subject area differences in academic activity time and in task type. Data analyses did not reveal significant differences between grade levels or perceived class abilities. If cognitive instruction is to be provided to help students take advantage of cognitive learning opportunities embedded within classroom activities, it seems important not only to increase teachers' awareness and knowledge about cognitive tasks and instruction but to offer workable strategies compatible with teacher perspectives and classroom management constraints. (PN)

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Classroom Activities as Settings for Cognitive Learning Opportunity and Instruction

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Classroom Activities as Settings for Cognitive Learning Opportunity and Instruction

Recent school based research has provided considerable data regarding the classroom behavior of teachers and students and, in some cases, the relationship between that behavior and students' achievement test scores (e.g., Stallings, 1975). Two major concepts emerging from this research are time on task and direct instruction (see Rosenshine, 1979). These concepts, however, have limited explanatory value. While time on task is an indicator of learning or opportunity to learn, it does not indicate the nature or quality of that opportunity (Cornbleth, 1980; Roehler & Duffy, 1981). Similarly, direct instruction does not indicate the nature or quality of that instruction. The conditions of direct instruction might be more appropriately described as structured opportunity to learn (Korth & Cornbleth, 1980).

In this paper, we examine the nature of classroom activities, cognitive learning opportunities, and instruction in the upper elementary-lower secondary grades within the academic subject areas. Drawing from the classroom and cognitive process research literature and the perspectives of social inquiry, our purpose is to describe and interpret classroom learning opportunities in terms compatible with the complexity of typical classroom events and teachers' understanding of those events. Such interpretive description should contribute to understanding classroom practice and the possibilities for change that might facilitate cognitive learning.

Teachers tend to organize their lessons in terms of activity sequence (Shavelson and Stern, 1981). Activities are characterized by patterns of overt teacher and student behaviors (e.g., writing, discussion, role-playing). Maintaining an orderly activity flow appears to be a high priority for most teachers. It is seen as a way of minimizing management problems and enabling students to learn. Student involvement in classroom activities is seen as evidence of teaching success and, presumably, learning (see Jackson, 1968).

Beyond the flow of classroom activities, teachers are primarily concerned with content--"covering" the information to be acquired. Less salient to teachers are the various cognitive tasks, embedded within academic activities, that students are expected to accomplish. Building on Doyle's (1980) task model, we see cognitive tasks as goal directed endeavors involving particular content and cognitive operations or skills. Cognitive tasks can be differentiated on the basis of the cognitive operations that are involved in their performance. The goals can be inferred from the operations students are expected to perform during academic activities and on tests (Greeno, 1976; Jenkins, 1979). During a social studies discussion, for example, students might be expected to recall specific information (memory), provide examples (comprehension), and figure out why something occured (reasoning).

Classroom activities thus constitute a context for one or more cognitive tasks. An activity is a setting for learning, and the cognitive tasks that are incorporated in academic activities afford opportunity to learn. The social structure of an activity affects the types of cognitive learning opportunities that might be provided within that setting. Activity settings also provide opportunities for social learning. Consider, for example, a recitation consisting of teacher question-student response-teacher reaction interactions, occasionally interspersed with teacher elaboration of important points and teacher reprimands to students deemed inattentive or uncooperative. Typically, the activity setting is mutually defined as one in which the teacher controls the interaction as director and judge while the student's role is a passive, dependent one of complying with teacher demands in order to obtain a favorable evaluation. The differential status of teacher and student in these exchanges is evident in their respective rights and responsibilities. The teacher as questioner has the right to determine the topic and how it is to be pursued, to speak at any time, to select other participants and terminate their participation. The students have the obligation to respond when requested and to remain quietly cooperative and receptive at other times. If students resist or challenge these implicit or explicit

rules, teachers tend to assert their authority or employ coercive power in an effort to regain control of the interaction. Teacher-student relationships during such a recitation create a social context (see Cornbleth, 1982b) that tends to constrain possibilities for cognitive learning and to communicate that patience and passive compliance are desirable social behaviors whereas initiative and originality are not. Students are effectively discouraged from seeking explanation or clarification of information, presenting or elaborating ideas, and reacting to others.

Classroom activities and cognitive tasks do not necessarily involve instruction. They provide an occasion for instruction but do not insure its presence. By instruction we mean active mediation (by teachers, peers, or curriculum materials) between students and what is to be learned so that students who otherwise would not accomplish a particular task can succeed and learn (Korth & Cornbleth, 1980). Cognitive instruction entails strategies for storing and retrieving information (e.g., Brown, 1978; Flavell& Wellman, 1977) comprehension (e.g., Brown, Campione & Day, 1981), and problem solving (e.g., Greeno, 1980). Such mediation might involve the explicit introduction and demonstration of mnemonic techniques, reasoning skills, or problem-solving strategies (Cornbleth & Korth, 1981). Cognitive instruction thus involves

(a) modeling or telling student how-to-do-it (e.g., remember, make sense of), or (b) raising questions that assist students in figuring it out for themselves (see Collins, 1977).[1]

It is our premise that if students have acquired the cognitive skills necessary to accomplish classroom tasks, i.e., elaborative processes that enable effective learning (see Rohwer, 1980), they are likely to be academically successful in school. Students who fail to develop these skills are likely to fall further and further behind, unable to take advantage of whatever opportunity and encouragement to learn might be available during classroom activities--unless instruction is also provided (e.g., Brown, Campione & Day, 1981; Feuerstein, 1980). Successful students also might be expected to benefit from instruction insofar as it enables them to refine their existing skills or expand their repertoire.

Efforts to modify the provision of cognitive instruction would best build on what teachers already do and perceive as important (e.g., Sarason, 1971; Smith & Anderson, 1981). Description of the nature and extent of cognitive instruction associated with cognitive tasks within activity settings should be useful for creating cognitive instructional strategies that are compatible with ongoing classroom practice (e.g., that enhance rather than impede the activity flow). It is this descriptive task that the present study has undertaken.

Methodology

Study Site

The study site was the seventh-eighth grade middle school in a suburban school district serving three communities adjacent to a large northeastern city. The 550 students in the school represent a range of socioeconomic backgrounds; although some qualify for free lunches, the large majority are middle class, and most are white. Students' standardized test scores are at or above national norms, and there are no major student behavior or faculty morale problems at the school.

Twelve of the 13 English, science, and social studies teachers agreed to participate in the study. The teachers' experience ranged from one to more than 20 years; most had at least 5-10 years of teaching experience. The sex, grade level, and teaching area of the participating teachers are presented in Table 1.

Insert Table 1 About Here

The classroom sample consisted of 23 classes, two classes taught by each teacher (with the exception of an English teacher who taught only one class). Teachers were asked to identify classes that seemed brighter or faster and classes that seemed slower than average. From each teacher's

nominations, one faster and one slower class were selected for observation to enable determination of differences in cognitive learning opportunity and instruction for groups of students perceived as either bright or slow.

Classroom Observation

Classroom events were observed directly by a member of the project team.[2] All observation sessions included an entire class period, which lasted 40-45 minutes depending on the school's schedule for that day. Each class was observed four times during the 1980-81 school year for a total of 92 classroom observations: 36 in English; 32 in science; and 24 in social studies.

During each classroom observation the following information was recorded: (a) the nature and duration of academic activities (management, transitional, and other non-academic activities were not recorded); (b) the type of academic task(s) students were expected to accomplish during each academic activity; and (c) the nature of any cognitive instruction provided. Interobserver agreement on the coding of activities, tasks, and instruction exceeded 80 percent across all observers.

On the basis of observers' descriptions, academic activities were grouped into nine categories:

Teacher presentation (TPRE) - giving directions or providing information, with few if any question-answer exchanges or other opportunities for direct student participation;

Question-answer with teacher elaboration (QATE) - a modification of simple question-answer recitation where students respond to teacher questions, and the teacher often elaborates on student responses or provides additional information;

Discussion (DISC) - interactive examination of ideas involving student-student and student-teacher as well as teacher-student information and question-answer exchanges;

Listening-viewing (LISV) - listening to and/or watching an audio-visual presentation, teacher or student demonstration, or non-teacher presentation (e.g., student oral report);

Silent Reading (READ);

Seatwork (STWK) - writing, including copying information and completing worksheets;

Project (PROJ) - including laboratory, game, role-playing, and simulation activities;

Quiz (QUIZ) - requiring written responses;

Other (OTHX).

Each activity segment was categorized according to the primary type of activity. For example, a segment consisting of question-answer with teacher elaboration and involving some silent reading (e.g., the teacher asks students to read a paragraph from their textbooks and then continues with questions) was

categorized as QATE. When more than one activity occured simultaneously (e.g., groups of students were doing different things), all activities were recorded and categorized.

Activity format was categorized on the basis of the number of students involved and the pacing of the activity. Activities where students worked alone at their own pace were coded as individual. Activities involving more than one student but less than the whole class, working at their own pace, were coded as group. Teacher paced activities involving the whole class were coded as class (including activities where each student individually completed a worksheet, item by item, under teacher direction).

From this data, the following scores were obtained: academic activity time (AAT), the proportion of class time that academic activities were in progress; AAT activities, the proportion of class time spent in each of the nine categories of academic activity; AAT format, the proportion of class time spent in individual, group, or class academic activities; and the number of AAT segments per class period.

Cognitive learning opportunities, tasks occurring during academic activities, were distinguished on the basis of the cognitive operations assumed necessary to accomplish assigned tasks. Information tasks involve the acquisition or recall of information . Comprehension tasks involve the application or use of information, e.g.,

translating, explaining, summarizing, comparing, identifying examples. Comprehension tasks were further distinguished as either convergent or divergent. For example, listening to, copying, or reciting definitions of simple, compound, and complex sentences would be an information task; classifying each sentence in a given list as simple, compound, or complex would be a convergent comprehension task; and creating one's own illustrations of each type of sentence would be a divergent comprehension task. Reasoning tasks involve the use of information and problem-solving skills or strategies, i.e., figuring out how a homemade barometer works.

Task type was coded for each activity segment according to the primary type of task provided students. Observations revealed that a number of activities involved primarily information or memory but also brief opportunities for comprehension or reasoning. These were categorized as information-plus.

From the task type data, scores were obtained for the proportion of class time allocated to each of the five types of tasks: information only (INFO), information-plus (INFO+), convergent comprehension (C-COMP), divergent comprehension (D-COMP), and reasoning (REAS).

Each identified episode of cognitive instruction was described with respect to its activity-task context, the stimulus or initiator (teacher initiative, student question,

student error in responding to a question, no student response to a teacher question), the provider of instruction (teacher, student, curriculm material), the target of instruction (memory, comprehension, reasoning), the nature of the instruction, and the approximate time duration of the instructional episode. The nature of instruction was categorized as telling, telling-plus (T+), questioning, or questioning-plus (Q+). T+ and Q+ instruction involved a cue, example, analogy, drawing, or reference to a curriculum material as well as telling or asking one or more questions.

Results

Data analyses did not reveal significant differences between grade levels or perceived class abilities. Results are presented by subject area and for the total group.

Activity Settings

Means and standard deviations for academic activity time (AAT) and AAT activities, formats, and segments are presented in Table 2.

Insert Table 2 About Here

AAT, the proportion of class time that academic activities were in progress, averaged 90 percent, with little variation

across the three subject areas. The number of AAT segments per 40-45 minute class period differed significantly by subject area ($F(2,86) = 4.45$, $p < .02$), ranging from 2.67 in social studies to 3.86 in English. The high proportion of time spent with academic activity seemed to be accomplished without apparent effort or recourse to unusual measures. The general atmosphere of these classes was serious but not unfriendly.

Of the nine categories of AAT activities, question and answer with teacher elaboration (QATE) and seatwork predominated, occupying 62 percent of class time and 70 percent of AAT. Teacher presentations (e.g., lectures) were infrequent as were other kinds of activities such as discussion, silent reading and projects . Multivariate analysis revealed significant subject area differences in AAT activities ($F(20,154) = 1.87$, $p < .02$), particularly in listening-viewing and activities categorized as "other." Listening-viewing activities were most frequent in science and did not occur in social studies; other activities such as conducting a mock election were most frequent in social studies and did not occur in science.

Consistent with the activity results, whole class and individual AAT formats predominated. Although multivariate analysis did not reveal significant subject area differences in AAT format, students in social studies classes tended to

spend more time with individual seatwork activities while students in English classes tended to spend more time with whole class QATE and listening-viewing activities.

Overall, the academic activity settings for cognitive learning opportunity and instruction seemed to be highly structured ones, providing for limited teacher-student interaction and very little student-student interaction. AAT activities and formats do not, however, directly indicate the types of cognitive learning opportunities afforded students.

Cognitive Learning Opportunities

Cognitive learning opportunities are described in terms of the types of tasks students are expected to accomplish during AAT activities. Five task types were distinguished on the basis of the cognitive operations assumed to be involved in task accomplishment. Means and standard deivations for the proportion of class time allocated to each of the five types of tasks are presented in Table 3.

Insert Table 3 About Here

During academic activities, students were most likely to encounter tasks requiring only information acquisition or recall (memory). Information-plus tasks, focusing on

information but involving some comprehension or reasoning, were also prominent. Opportunity to engage in comprehension tasks was limited while reasoning opportunities were minimal. Overall, information tasks accounted for 69 percent of class time and 77 percent of AAT.

Multivariate analysis revealed significant subject area differences in task type ($F(10,164) = 5.32$, $p < .001$), with significant univariate differences in all but reasoning tasks. Information-only tasks were most prominent in social studies, information-plus tasks in science, and both convergent and divergent comprehension tasks in English.

To determine whether particular types of activities and tasks are associated with one another, QATE segments, which accounted for the largest proportion of AAT, were analyzed by task type. The number and percent of QATE segments characterized by each type of task are presented in Table 4.

Insert Table 4 About Here

Although different types of cognitive learning opportunities were provided within a QATE activity setting, information tasks occured most frequently, followed by INFO+ and C-COMP tasks. Interestingly, the conventional recitation was not observed in these classes, and its apparent successor, QATE, seems to incorporate more varied learning opportunities

than attributed to the recitation (also, see Stodolsky, Ferguson, & Wimpelberg, 1981).

The rare occurrence of D-COMP and REAS tasks during QATE may be a function of their requiring more "time to think" than is typically found in interactive whole class activities such as QATE where maintaining momentum seems to be a priority. Examination of the activity settings in which D-COMP and REAS tasks occurred showed that a majority appeared during seatwork activities, which is consistent with the "time to think" hypothesis. It also indicates that seatwork can and sometimes does involve more than copying or writing answers to factual information questions.

Cognitive Instruction

During 92 class periods, only 28 episodes of cognitive instruction were observed ($\bar{X}$ = .30, SD = .63). Although a majority occurred in science, subject area differences were not significant. The nature and activity-task context of the instructional episodes are summarized in Table 5.

Insert Table 5 About Here

In each case, instruction was provided by the teacher, occasionally with reference to curriculum materials. Most instructional episodes lasted less than one minute.

Cognitive instruction was stimulated by students (17 of 28 episodes) more often than it was initiated by the teacher. It appears that when teachers provide cognitive instruction, they are somewhat more likely to respond spontaneously to perceived student need than to anticipate student needs and preplan instruction.

Although INFO and INFO+ tasks predominated, and cognitive instruction most often occurred during INFO+ tasks, the target of instruction was more often comprehension than either memory or reasoning. Since QATE activities occupied the largest proportion of AAT, it is not surprising that most of the instructional episodes occurred during QATE. However, while QATE occupied 35 percent of class time, proportionally more of the episodes (86 percent) occurred here.

Instructional episodes were equally likely to involve telling (and T+) as questioning (and Q+). However, teacher initiated instruction was more often telling or T+ (7 of 11 episodes) while student stimulated instruction tended to be questioning or Q+ (10 of 17 episodes). The nature of instruction also differed with the target. All of the memory instructional episodes involved telling or T+, whereas all of the reasoning episodes involved Q+. The comprehension episodes were about equally divided between telling (and T+) and questioning (and Q+).

Discussion

We began by proposing that opportunity is a necessary but insufficient condition for cognitive learning and that efforts to enhance the quality or quantity of cognitive instruction would best build on what teachers already do and perceive as important. Consequently, in the present study, we have attempted to describe the nature and extent of cognitive instruction associated with cognitive learning opportunities within activity settings.

The teachers whose classrooms we observed appeared to be practicing direct instruction as described by Rosenshine (1979, p. 38) and others, and student time-on-task seemed quite high. Yet, the range of cognitive learning opportunities as well as the extent of cognitive instruction was limited. Although the students in these classes were provided considerable time to learn, the types of cognitive learning opportunities indicated by the tasks students were expected to accomplish most often involved acquisition and reproduction of information provided by the teacher or curriculum materials.

The infrequent occurrence of comprehension and reasoning tasks and of cognitive instruction is consistent with the findings of others (e.g., Duffy & McIntyre, 1980; Durkin, 1978-79; Leinhardt, Zigmond, & Cooley, 1981) and the evidence that teachers tend to think about teaching and learning in

terms of activity sequences and maintaining an orderly flow of activities. If students lack the requisite skills, they are likely to find comprehension and reasoning tasks frustrating, and their requests for assistance and off-task behavior will disrupt the activity flow. Reacting to student questions, errors, or lack of response with cognitive instruction may also interrupt desired momentum. Although teachers in the present study more often provided instruction during QATE than other activities and in response to students than on their own initiative, they provided instruction in response to a very small proportion of student questions, errors, and non response to questions during QATE. If the teacher simply answers a student question, corrects a student error, or calls on another student, the activity will proceed more smoothly.

It appears that while QATE as practiced by these teachers does offer different types of tasks and the opportunity to recognize student questions, errors, and lack of response, its potential as a setting for comprehension and reasoning tasks or for student stimulated instruction is limited. QATE does not seem to be especially conducive to student questioning for explanation or clarification, to the presentation of or reaction to ideas, or to cognitive instruction. Exploration of other activity settings and how teachers might be helped to recognize their potential and better manage them seems warranted. Seatwork settings, for example, could provide

the "time to think" required for D-COMP and REAS tasks and for student stimulated cognitive instruction. With some modification, teacher presentation and listening-viewing activities could provide more teacher initiated instruction as could QATE and seatwork.

Calling teachers' attention to cognitive tasks and instruction, however, is unlikely to have the desired effects unless it can be shown that cognitive instruction will help students accomplish comprehension and reasoning as well as information tasks and that such instruction can be provided without increasing classroom management demands, (see Le Compte, 1978; Westbury, 1973). Therefore, curriculum and instructional development and future classroom research might well consider what might be called nonobtrusive cognitive instructional strategies. Although limited in number, the observed instances of instruction and their activity-task contexts are suggestive of such strategies.

Nonobtrusive strategies seem more likely to be teacher initiated (proactive) than student stimulated (reactive). Proactive instruction is usually incorporated into teacher presentations, the teacher elaboration segments of QATE, and the curriculum materials used in seatwork, listening-viewing, and reading activities. On the basis of observed episodes of naturally occurring cognitive instruction, a tentative inventory of forms of cognitive instruction is offered in Figure 1 as

suggestive of the range of possibilities for cognitive instruction.

Insert Figure 1 About Here

For example, during a QATE segment in an 8th grade science class, the teacher offered a mechanical mnemonic to help students remember new terminology while describing the earth's orbit around the sun and drawing a simple diagram on the chalkboard. She indicated that the earth's orbit is elliptical and defined the terms, aphelion (point of the earth's orbit furthest away from the sun) and perihelion (point of the earth's orbit closest to the sun). Then, she suggested that "you can remember which is which. Remember that both aphelion and away start with an 'a'."

Proactive instruction might also be incorporated into curriculum materials. Most curriculum materials, however, provide tasks for students to accomplish but rarely provide instructional assistance (e.g., Greeno, 1980). Worksheets, for example, might not only ask students to identify the main idea of a presentation but also explain what main ideas are and how to recognize them. There appears to be considerable room for improvement of curriculum materials in this regard. Since curriculum materials play a major role in shaping classroom activities and cognitive learning opportunities

(e.g., Cornbleth, 1982; Stake & Easley, 1978) and are likely to continue to do so, it seems appropriate to focus efforts on materials improvement.

Reactive instruction, that is, instruction provided in response to perceived student need (Roehler & Duffy, 1981) seems most feasible in small group or one-to-one settings such as seatwork where student questions and extended interactions with one or a few students are less likely to be disruptive of the activity flow or the involvement of other students. Strategic questioning (see Figure 1) would seem to be particularly appropriate here.

For example, in a 7th grade science class, the teacher used strategic questions plus props to help students figure out how a homemade barometer works. The class had talked about and looked at instruments for measuring air pressure. The teacher then described how students could make their own barometers (using a jar or can, balloon, straw, and pin) and drew an illustration on the chalkboard. He then said, "How is it going to tell you anything about air pressure? See if you can figure it out." Following several unsatisfactory student responses, he provided materials and asked two students to set up a demonstration barometer. Returning to the chalkboard drawing, he asked a more specific question, "What will happen to the straw if the outside pressure rises?" A student correctly responded that "the balloon will sink in, and

and the straw will tilt up," and the activity continued.

In another instance, during a 7th grade social studies class, the teacher used a brief series of easily answerable questions based on a previously given definition to help a student comprehend the concept of peninsula.

S: Is Greece a peninsula?

T: Is it surrounded on three sides of water?

S: Um-hmm.

T: Is it attached to a larger body of land?

S: Yes.

T: Then, is it a peninsula?

S: Yes.

T: Right.

In sum, if cognitive instruction is to be provided to help students take advantage of cognitive learning opportunities embedded within classroom activities, it seems important not only to increase teachers' awareness and knowledge about cognitive tasks and instruction but to offer workable strategies compatible with teacher perspectives and classroom management constraints. To do so would also necessitate some reorientation of the perspectives of curriculum developers and classroom researchers regarding elements of teaching-learning effectiveness in order to refine and test the ideas presented here.

Notes

1. Providing cognitive instruction does not mean imposing a particular schema or strategy by insisting that students use it instead of equally feasible alternatives. Cognitive instruction should serve to expand rather than limit students' cognitive capacity.
2. The project team included our colleague at the University of Pittsburgh, Ernest B. Dorow, and graduate students Risa Dubin, Susan Smith, and Nancy Varner, without whose participation the study could not have been undertaken.

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Table 1

Teachers' Sex, Grade Level, and Teaching Area

	English	Science	Social Studies
7th Grade	F F F	M M	M M
8th Grade	M F	M F	M

Note: M = male; F = female.

Table 2

Means and Standards Deviations for Academic

Academic Activity (AAT): AAT Segments,

Activities, and Formats

	English		Science		Social Studies		Total	
	n=36		n=32		n=24		N=92	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Percent AAT.	88.89	8.72	88.81	10.50	92.17	4.82	89.72	8.65
Number of AAT Segments*	3.86	1.62	2.88	2.09	2.67	1.09	3.21	1.76
Percent AAT Activities*								
TPRE	6.06	8.74	8.41	17.33	6.71	13.21	7.04	13.30
QATE	40.89	26.45	32.19	35.48	29.63	34.84	34.92	32.07
DISC	1.19	4.17	1.75	7.00	.25	1.23	1.14	4.91
LISV*	7.69	13.42	11.50	21.71	0	0	7.01	15.82
READ	3.53	9.37	.78	3.10	1.63	4.21	2.08	6.56
STWK	22.58	21.75	27.63	31.58	34.54	30.03	27.46	28.53
PROJ	3.11	15.04	2.09	8.17	9.63	23.41	4.46	16.06
QUIZ	2.94	7.98	4.47	12.30	5.75	16.72	4.21	12.16
OTHX*	.72	4.33	0	0	4.17	9.35	1.37	5.68
Percent AAT Formats								
Class	63.03	27.23	54.38	33.62	41.54	35.94	54.41	32.71
Group	1.42	6.34	4.09	11.30	8.50	21.89	4.20	13.71
Individual	24.64	26.18	30.66	34.15	42.33	36.52	31.35	32.37

*$p < .05$

Table 3

Means and Standards Deviations for

Types of Cognitive Tasks

	English		Science		Social Studies		Total	
	n=36		n=32		n=24		N=92	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Task Type*								
INFO*	29.61	25.77	40.56	33.00	68.63	31.32	43.60	33.47
INFO+*	18.06	26.82	36.88	34.95	19.25	27.61	24.91	31.03
C-COMP*	23.50	28.03	9.63	24.51	4.08	14.36	13.61	25.04
D-COMP*	13.61	25.07	.72	4.07	.42	2.04	5.69	17.01
REAS	3.47	13.11	.38	2.12	0	0	1.49	8.38

*$p < .05$

Table 4

QATE Segments

by Type of Task

	English		Science		Social Studies		Total	
	n=63		n=30		n=22		N=115	
Task Type	No.	%	No.	%	No.	%	No.	%
INFO	20	31.74	18	60.00	13	59.09	51	44.34
INFO+	17	26.98	11	36.66	6	27.27	34	29.56
C-COMP	21	33.33	1	3.33	2	9.09	24	20.86
D-COMP	4	6.34	0	0	1	4.54	5	4.34
REAS	1	1.58	0	0	0	0	1	.86

Note: n/N=number of QATE segments.

Table 5

Nature and Activity-Task Context

of Instructional Episodes

	English n=8	Science n=15	Social Studies n=5	Total N=28
Stimulus/Initiator				
No Student Response	1	1	2	4
Student Error	4	6	0	10
Student Question	2	0	1	3
Teacher	1	8	2	11
Target				
Memory	1	3	1	5
Comprehension	7	10	3	20
Reasoning	0	2	1	3
Nature				
Telling	3	6	1	10
Telling+	2	2	0	4
Questioning	1	2	3	6
Questioning*	2	5	1	8
Activity				
QATE	6	14	4	24
TPRE	1	0	1	2
STWK	1	1	0	2
Task				
INFO	2	2	1	5
INFO+	2	12	3	17
COMP	3	1	1	5
REAS	1	0	0	1

Note: n/N = number of instructional episodes.

Figure 1

Inventory of Cognitive Instruction

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1. Indicating mnemonics for recall, recognition, or reconstruction
   a. mechanical or logical connections
   b. substantive associations
      1) common characteristics linkages
      2) linkages with familiar phenomena
2. Offering stories or vignettes that interrelate new with familiar information
3. Using familiar analogies or examples to explain an idea, event, or process
4. Modeling or demonstrating a task or process to illustrate its operation
5. Suggesting conceptual organizers
   a. hierarchies
   b. outlines
   c. diagrams
   d. classification schemes
   e. logical relationships
6. Strategic questioning, e.g.,
   a. asking about a familiar case parallel to the one in question
   b. asking for possible (causal or subsequent) factors
   c. formulating an inadequate rule (generalization, explanation) and asking what might happen if it were followed in a particular known situation
   d. asking for the application of a general principal to a new case